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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/608,814	06/27/2003	Hiroyasu Inoue	890050.432	7941

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EXAMINER	
ANGEBRANNDT, MARTIN J	

ART UNIT	PAPER NUMBER
1756	

DATE MAILED: 08/05/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/608,814	INOUE ET AL.	
	Examiner	Art Unit	
	Jennifer R. Sadula	1756	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 June 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) *11-20* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *27 June 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *6/27/03, 11/19/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☒ Other: *IDS 1/25/05*.

DETAILED ACTION

Election/Restrictions

Restriction to one of the following inventions is required under 35 U.S.C. 121:

I. Claims 1-10, drawn to an optical recording media, classified in class 430, subclass 270.1.

II. Claims 11-20, drawn to a method of using an optical recording media, classified in class 369, subclass 18.

The inventions are distinct, each from the other because of the following reasons: Inventions I and II are related as product and process of use. The inventions can be shown to be distinct if either or both of the following can be shown: (1) the process for using the product as claimed can be practiced with another materially different product or (2) the product as claimed can be used in a materially different process of using that product (MPEP § 806.05(h)). In the instant case the product can be used via different methods. For example- the recording media may be read with a longer wavelength with near-field imaging or shorter wavelength at far-field imaging.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art because of their recognized divergent subject matter, restriction for examination purposes as indicated is proper.

During a telephone conversation with David V. Carlson on 13 April 2005 a provisional election was made without traverse to prosecute the invention of group I, claims 1-10. Affirmation of this election must be made by applicant in replying to this Office action. Claims

11-20 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Information Disclosure Statement

The IDS's of 6/27/03, 11/19/04 and 1/25/05 have all been considered.

Double Patenting

Claims 1-10 of this application conflict with claims 11-12 of Application No. 10/423,686. 37 CFR 1.78(b) provides that when two or more applications filed by the same applicant contain conflicting claims, elimination of such claims from all but one application may be required in the absence of good and sufficient reason for their retention during pendency in more than one application. Applicant is required to either cancel the conflicting claims from all but one application or maintain a clear line of demarcation between the applications. See MPEP § 822. This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claims 1-10 of this application conflict with claims 1-10 (most specifically, 9-10) of Application No. 10/406,109. 37 CFR 1.78(b) provides that when two or more applications filed by the same applicant contain conflicting claims, elimination of such claims from all but one application may be required in the absence of good and sufficient reason for their retention during pendency in more than one application. Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims of the copending application overlaps with the embodiment of the instant claims where Cu is the primary element (claim 2) and the additive is Al, Zn, Ag, Sn, Ti, Mg or Au (claim 7) and the first recording layer is any of Si, Ge, Sn, Mg, In, Zn, Bi or Al. Applicant is required to either cancel the conflicting claims from all but one application or maintain a clear line of demarcation between the applications. See MPEP § 822. This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claims 1-10 of this application conflict with claims 1-19 of copending Application No. 10/764,805 (US 2004/0157158). Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims of the copending application overlaps with the embodiment of the instant claims where Cu is the primary element and Al is the additive and the first recording layer is any of Si, Ge, Sn, Mg, In, Zn, Bi or Al. This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claims 1-10 of this application conflict with claims1-12 of copending Application No. 10/896,110 (US 2005/0018591). Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims of the copending application overlaps with the embodiment of the instant claims where Cu is the primary element and Si is the additive and the first recording layer is Si. This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claims 1-10 of this application conflict with claims 1-12 of copending Application No. 10/923,666 (US 2005/0047301). Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims of the copending application overlaps with the embodiment of the instant claims where Cu is the primary element and Mg is the additive and the first recording layer is Si. This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claims 1-10 of this application conflict with claims 1-19 of copending Application No. 10/923,699 (US 2005/0047306). Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims of the copending application overlaps with the embodiment of the instant claims where Cu is the primary element and Au is the additive and the first recording layer is Si. This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claims 1-10 of this application conflict with claims 1-12 of copending Application No. 10/923,679 (US 2005/0047304). Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims of the copending application overlaps with the embodiment of the instant claims where Cu is the primary element and Zn is the additive and the first recording layer is Si. This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claims 1-10 of this application conflict with claims 1-19 of copending Application No. 10/613,525 (US 2004/0052194). Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims of the copending application overlaps with the embodiment of the instant claims where Cu is the primary element (claim 3) and the additive is Al, Zn, Sn, Mg or Au (claim 4) and the first recording layer is any of Si, Ge, Sn, Mg, In, Zn, Bi or Al. This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claims 1-10 of this application conflict with claims 1-20 of copending Application No. 10/684981 (US 2004/0076907). Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims of the copending application overlaps with the embodiment of the instant claims where Cu is the primary element (claim 11) and the additive is Al, Zn, Ag, Sn, Ti, Mg or Au (claim 13) and the first recording layer is any of Si, Ge, Sn, Mg, In, Zn, Bi or Al. This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claims 1-10 of this application conflict with claims 1-24 of copending Application No. 10/717,831 (US 2004/0110086). Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims of the copending application overlaps with the embodiment of the instant claims where Cu is the primary element (claim 1) and the additive is Al, Zn, Sn, Mg or Au (claim 13) and the first recording layer is any of Si, Ge, Sn, Mg, In, Zn, Bi or Al. This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Applicant claims an optical recording medium comprising a substrate, recording layer, and at least one dielectric layer adjacent to the recording medium wherein the recording medium maintains a record mark whose reflection coefficient is different from those of other regions of the recording layer and wherein the dielectric layer(s) exhibits phase change (crystallization) adjacent to the record mark.

Claim 1 is rejected under 35 U.S.C. 102(e) as being fully anticipated by Shuy et al., U.S. Patent Publication No. 2001/0021160 ("Shuy").

Shuy et al. '160 teaches a transparent layer of Ge, Si, GaP, InP, GaAs, InAs, ZnSb, TiO_2, Sb-Zn oxide as a transparent layer (30) in a thickness of 5-500 nm and reflective layer (40) may be Ag, Al, Au, Pt, Cu, Sn, Ir, Ta and alloys and/or combinations thereof in a thickness of 1-500 nm. [0026-0027]. The examples use silicon and gold as the materials. In figure 1A, the provision of thermal manipulation layers (dielectric layers) is disclosed and the use of protective layers is disclosed. (60). Shuy further teaches in embodiment 4 that a substrate (10) with a layering sequence of $ZnS\text{-}SiO_2$/ Si/ (Si-Au)/$(ZnS\text{-}SiO_2)_2$ is formed.

Claims 1-6 and 9-10 are rejected under 35 U.S.C. 102(a) as being fully anticipated by Mizushima et al., Japanese Publication No. 2003-054135 ("Mizushima I"). A machine translation has been provided herewith and is relied upon for this rejection.

Mizushima I teaches an optical recording medium and method of use wherein the medium has a laminated recording layer containing a first sub-recording layer and a second sub-recording layer and both of the main component metals of the recording layers have melting points which are higher than 500°C wherein the metals alloy to form a record mark (abstract). These metals are diffused to be mixed by irradiation with a laser beam wherein upon irradiation the reflectivity is changed irreversibly. The layers are indeed phase-change materials (claim 2) noting their change between amorphous to crystalline. The two layers are different metals (claim 1), and the materials substantially overlap those as claimed by the Applicants (note paragraphs 27-29). With regard to claims 9-10, Mizushima I teaches a protective layer as well as various

dielectric layers (0039-0041, 0095-0101). As noted in the example (0058-0062) the first dielectric layer was made of ZnS-SiO2 and the recording layer contained a laminated two layer structure of Sb/Al. However Al vs Te/Ge was also exemplified (0074). Examiner's assertion is that the same compounds will react the same way (or similarly) under the same circumstances and thus the materials of Mizushima I anticipate these irradiations.

Claims 1-10 are rejected under 35 U.S.C. 102(e) as being fully anticipated by Hosoda et al., U.S. Patent No. 6,841,218 ("Hosoda").

Hosoda teaches a write-once optical recording medium wherein as shown in figure 2 an alloying (17) occurs between the recording layers 14a and 14b. These recording layers are sandwiched between dielectric layers 15, 13 wherein 16 is a protective layer and 11 is a substrate (3:25-43). The dielectric layers are preferably materials such as ZnS, SiO2, AnS-SiO2 and the like (4:44-55). The recording layers are as detailed at the top of column 4 wherein 14a (which anticipates Applicants' second recording layer) can be Ag and 14ba (which anticipates Applicants' first recording layer) can be GeTe or Sn (see also description of figure 1, 5:47-6:35). Hosoda further teaches that it is desirable to increase the amount of Ge or Te when it is desirable to increase the amount of Ge or Te to generally slow down the crystallization rate (thereby making the amorphous state more stable). With regard to the Applicants' desirability of the ratio of λ /NA$\leq$640nm upon irradiation with a laser beam having a wavelength of λ via an objective lens having a numerical aperture NA, Examiner notes cases such as λ=405nm and NA is 0.85 thereby anticipating λ /NA is approximately 476nm.

Claims 1-10 are rejected under 35 U.S.C. 102(a) as being fully anticipated by Inoue et al., "Inorganic Write-once Disc for High Speed Recording" J. Appl. Phys., Vol. 42, part 1, No. 2B pp. 1059-1061 (02/2003) ("Inoue").

Inoue teaches an inorganic write-once disc for use at low wavelength recording such as 405 nm and a numerical aperture of 0.85 (thereby satisfying the ratio) (see "Experimental Conditions", and table 1). In the example of figure 1, the bilayer is Si/Cu alloy and the device is sequentially: substrate, reflective layer, and the alloy wherein there are further dielectric layers sandwiching the recording bilayer. With regard to claims 9-10, the protective layer is a ZnS-SiO_2 layer however there is an additional cover layer shown in figure 1. The Cu alloy and the Si are mixed to become a recorded mark.

Claim 1 is rejected under 35 U.S.C. 102(e) as being fully anticipated by Ashida et al., U.S. Patent No. 6,805,935 ("Ashida").

Ashida teaches an optical recording medium capable of preventing a cross erase and increasing its recording density wherein the material comprises substrate (201), reflecting film (202), dielectric films (203, 205, 207), semitransparent metal films (204, 208), recording film (206), and a protective cover layer (209). With regard to the Applicants' desirability of the ratio of λ /NA$\leq$640nm upon irradiation with a laser beam having a wavelength of λ via an objective lens having a numerical aperture NA, Examiner notes cases such as λ=405nm and NA is 0.85 thereby anticipating λ /NA is approximately 476nm (10:10-19). Examiner notes specificity of figure 1 and the details of such in column 9 for anticipation of specific compounds.

Claims 1-6, 9-10 are rejected under 35 U.S.C. 102(b) as being fully anticipated by Kobayashi, Japanese Publication No. 62-204442. An English language translation of this abstract is provided. Examiner requests that if the Applicants have a translation made of this reference that such be provided with Applicant's response.

Kobayashi teaches an optical recording media comprising a recording layer consisting of at least two kinds of phase-change films having different composition wherein the first recording layer is of Si ,Te, or the like and the second recording material is Au, Ag, Ge or the like. When the materials are recorded, the recording layers are alloyed. Recording layers (41, 42) are provided between dielectric layers (3, 5) wherein a protective layer (6) is opposite the substrate (2). With regard to the Applicants' capabilities of properties under specific irradiation, it is the Examiner's assertion is that the same compounds will react the same way (or similarly) under the same circumstances and thus the materials of Kobayashi anticipate these irradiations. While these properties are not specified in the English language abstract, it is further the Examiner's assertion that it would have been obvious to one of ordinary skill in the art at the time of invention to utilize the materials under near-field conditions, thereby satisfying these requirements. Examiner notes that with regard to claims 9-10 the additional dielectric layer furthest from the substrate acts as a "protective layer" as the dielectric layer can act as a barrier from damage from oxygen, mechanical contact and the like (further teaching found in example 4).

Claims 1-6 and 9-10 are rejected under 35 U.S.C. 102(b) as being fully anticipated by Lee et al., U.S. Patent No. 4,477,819 ("Lee").

Lee teaches an optical recording medium comprising an alloying of adjoining layers 14 and 16 (figure 4). Preferably the material consists of a PMMA substrate followed by a deposition of Al / Ge/ and a passivating layer of SiO_2 as shown in figure 1 (3:25-38). Similar mediums of Al/Si/MgO on a PMMA substrate (3:39-49) and Sn/Pb/Ge-Al (3:50-61) were also formed wherein the dielectric layer is light transmissible.

Claims 1-10 are rejected under 35 U.S.C. 102(a) as being fully anticipated by Hayashi et al., Japanese Publication No. 2002-269808 ("Hayashi"). A machine translation of the abstract has been provided herewith and is relied upon for this rejection.

Hayashi teaches an information recording medium with alloying as shown in figures 4 and 5. In examples 3 and 5, layers of AlTe/ Gi/ SiN vs Al/Ge/ScN are taught (0028-0029).

Claims 1-6 and 9-10 are rejected under 35 U.S.C. 102(b) as being fully anticipated by Harigai et al., Japanese Publication No. 06-171236 ("Harigai").

Harigai teaches an optical recording medium comprising an diffusion between Al or Au and Ge in a write-once alloying optical recording media. Note Example 1 (0024) wherein a polycarbonate substrate maintains a Ge film and AnS-SiO2 and an Al film. Additionally, Examiner notes example 4 being the same layers in a different order (0037).

Claims 1-6 and 9-10 are rejected under 35 U.S.C. 102(e) as being fully anticipated by Mizushima et al., U.S. Patent No. 6,656,559 ("Mizushima '559").

Mizushima '559 teaches an optical recording medium comprising alloying recording layers 41, 42 wherein these recording layers are phase change materials which are sandwiched between dielectric layers 31, 32 (10:19-37). The record mark is a region of altered properties and characteristics such as change in refraction (8:21-39). The phase change layer 41 and functional layer anticipate Applicants second and first recording layers respectively (10:52-11:8) wherein it anticipates the Ge/(Ag, Al, Si, Zn) options. With regard to Applicants claims 9-10, protective layer is taught in column 15, lines 44-52. Examiner once again asserts that the same compounds will react the same way (or similarly) under the same circumstances and thus the materials of Mizushima '559 anticipate these irradiations. While these properties are not specified in the English language translation, it is further the Examiner's assertion that it would have been obvious to one of ordinary skill in the art at the time of invention to utilize the materials under near-field conditions, thereby satisfying these requirements.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kobayashi, as applied above, in view of Morimoto et al., U.S. Patent No 4,670,345 ("Morimoto").

Kobayashi teaches the device substantially as claimed however fails to exemplify the use of a protective layer other than the use of additional dielectric layers.

Morimoto teaches that the reflective layer may be on the same side of the recording film as the substrate if topside recording is to be used and on the opposite side of the recording films from the substrate if the recording is to take place through the substrate (6:42-65). The dielectric layers are disclosed as providing improvements in the stability and sensitivity of the overall device (7:42-8:12). The prevention of direct contact with the recording layer is further disclosed (7:1-10).

Thus it would have been obvious to one of ordinary skill in the art at the time of invention to make the device of Kobayashi with a protective layer with a reasonable expectation of success as Morimoto teaches that such would enhance the recording medium by protecting such from damage from oxygen and mechanical contact.

Claims 1-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shuy, as applied above.

Shuy teaches the materials substantially as claimed. However it would have been obvious to one of ordinary skill in the art at the time of invention to make the device utilizing other reflective layers or alloys of Cu, Al, Ag and/or combinations thereof in place of the Au-Si alloy of the examples (see example 4).

Claims 1-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shuy, as applied above, in view of any one of Yoshida et al. JP 10-143919, Uchiyama et al. '351, Lee et al. '326 or Uno et al. '239.

Yoshida et al. JP 10-143919 (machine translation attached) teaches the addition of Al to Cu to improve the corrosion resistance [0017]. The addition of Fe, Mn, Au, Pt, Pd, Ti, Mo, Ta, Zr, V, W, etc to further improve the corrosion resistance is disclosed [0018].

Uchiyama et al. '351 teach the addition of Ag or Au to Cu reflective layers to form films with improved corrosion resistance, high reflectivity and film hardness. (5/22-6/21)

Lee et al. '326 teach the addition of various materials to improve the corrosion resistance of Al,Ag, Au or Cu reflective layers in optical recording media, such as Cr, Mg, Ti, Ni and Si. (3/41-46).

Uno et al. '239 teach the addition of various materials to improve the corrosion resistance of Ag, Au or Cu reflective layers in optical recording media, such as Cr, Pt, Pd, Al, Mg, W, Ni, Mo, Si and Ge. (9/14-23).

In addition to the basis provided above, it would have been obvious to one skilled in the art to modify the teachings of Shuy away from single element reflective layers and towards binary reflective layers, such as copper alloys with Al, Si, Ag, Au, Fe, Mg, Ge, Cr or Ti to improve the stability of the unrecorded media by improving their corrosion resistance as taught by Yoshida et al. JP 10-143919, Uchiyama et al. '351, Lee et al. '326 or Uno et al. '239.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

A) Kondo et al., U.S. Patent Publication No. 2003/0224215 teaches an information recording medium and apparatus for reproducing and recording information as shown in figures 1 and 3, wherein figure 3 is an enlarged view of the information recording medium of figure 1 exhibiting a state of being recorded. The information recording medium (1) of Kondo is at least composed of a first light transmitting layer (11X), a first recording layer (12X), a second light transmitting layer (11Y), a second recording layer (12Y) and a substrate (13) wherein an embossed microscopic pattern is formed on the first and second recording layers (12X, 12Y). Information is recorded on either one of a raised portion "A" and a recessed portion "B" as a record mark "M" (0075, 0082). The recording material is a phase-change material of which reflectivity or refractive indices change wherein the recording layers are further taught by Kondo to be either the same or different (0082).

Attention is specifically drawn to figure 33 wherein upon a substrate (13) the following lie in succession: reflective layer (121Y), protective layer (122Y), recording layer (123Y),

protective layer (124Y) and a light transmitting layer(11Y). These protective layers are taught to be oxidized thin films of semiconductors such as Si or Al, or nitrides of metals such as Si, or sulfide thin films such as ZnS wherein with respect to a film mixture Kondo teaches ZnS-SiO_2 to be preferred (0334). These materials substantially overlap those taught by Applicants to be the materials of choice for the dielectric layers (see Applicants specification, 0074). As shown in figure 33 these layers are adjacent to the recording layer.

Additionally, Kondo teaches that the optical recording medium is capable of satisfying the equation λ /NA$\leq$640nm upon irradiation with a laser beam having a wavelength of λ via an objective lens having a numerical aperture NA. Examiner notes cases such as λ=350-450nm and NA is 0.75-0.9 (paragraph 0123) thereby anticipating λ /NA is a range of 388.888nm – 600nm. Further support of this is taught in paragraph 0122 wherein Kondo teaches that λ /NA defines the spot diameter "S". Thus, clearly the intended use of the wavelength/numeric aperture ratio for the optical recording medium is taught. However, Kondo never discusses an alloying of the dielectric layer(s) and the recording layer.

B) Hirotsune et al., U.S. Patent No. 5,912,104 teaches the provision of the reflective layer on either side of the recording layer ad the provision of a protective or dielectric layer between the recording film and the reflective layer (16:42-51, 43:8-24, and figure 3).

C) Harigai et al., Japanese Publication No. 2000-187884 teaches optical recording media using alloying of two recording layers. Machine translation attached.

D) Nagata et al., U.S. Patent No 6,807,142 teaches an optical recording medium comprising laminated layers of recording materials which alloy and dielectric layers (see figure 3 and 7:40-54).

E) Xu et al., Chinese Patent No. 1330368 (English language translation of this abstract is provided) teaches an optical recording medium-membrane comprising sequentially: a substrate, a transparent layer and a reflecting layer, and a protective layer wherein the transparent layer (30) (understood to be a dielectric layer) and the reflecting layer (40) (understood to be a recording layer) will react and form a alloy/compound (see figure 2B, item 35) as a semitransparent region when irradiated with visible light. This recording mark semitransparent region has optical signal contrast-modulating mechanism. With regard to Applicants' ratio of numerical aperture to wavelength, Xu teaches that the semitransparent region can be affected by a reduction in the thickness to change the optical path difference and to set up interference or destroy the interference. Additionally, this can be affected by a change in the optical constants (n & k) to change optical reflected intensity. The transparent layer is made of Si, Ge, GaP, InP, GaAs, InAs, ZnSb, TiO2, Sb-Zn oxide and their alloys or mixtures. The reflecting layer comprises Ag, Al, Au, Pt, Cu, Sn, Ir, Ta and their alloys.

F) Kuroda et al., U.S. Patent No. 6,551,679, Oshima et al., U.S. Patent No. 6,266,299, and Yoshioka et al., U.S. Patent No. 5,194,363 all teach similarly alloying materials.

G) Sugiyama et al., U.S. Patent No. 5,414,451 teaches satisfaction of Applicants' ratio.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer R. Sadula whose telephone number is 571.272.1391. The examiner can normally be reached on Monday through Friday, 10am-6pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark F. Huff can be reached on 571.272.1385. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JRS
13 April 2005

MARTIN ANGEBRANNDT
PRIMARY EXAMINER
GROUP 1100 1756